F10

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: 0 511 182 A2

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: 92850085.9

(51) Int. Cl.^{5}: F42D 5/045

(22) Date of filing: 15.04.92

(30) Priority: 24.04.91 SE 9101228

(43) Date of publication of application:
28.10.92 Bulletin 92/44

(84) Designated Contracting States:
DE FR GB SE

(71) Applicant: OLCON ENGINEERING AB
Herrgarden, Frykerud PL 3443
S-665 00 Kil (SE)

(72) Inventor: Ohlson, Johnny
Herrgardena Frykerud, Pl 3443
S-665 00 Kil (SE)

(74) Representative: Falk, Bengt
Swedish Ordnance Patents and Trademarks
S-691 80 Karlskoga (SE)

(54) **A blast and splinter proof screening device and a method of manufacturing same.**

(57) The present invention relates to a blast and splinter-proof device, a so-called blast canister (3, 6), intended to screen off and protect its surroundings against the detonation forces and possible splinters from detonating charges by, on the one hand, absorbing them itself and, on the other hand, deflecting them in that direction most favourable to the surroundings, i.e. in the majority of cases in an upward direction.

EP 0 511 182 A2

Jouve, 18, rue Saint-Denis, 75001 PARIS

TECHNICAL FIELD

The present invention relates to a readily portable blast and splinter-proof screening device intended to screen off and protect the surroundings against detonation forces and any splinters formed from detonating explosive charges primarily of limited force. The primary field of application of the device according to the present invention is in connection with disposal of duds from artillery firing, clearing of mine fields on land, as well as in the defusing or disarming of sabotage and terrorist charges, booby traps etc., hence primarily in respect of indicating and demarcating the surroundings from the effects of explosive charges which are located at undesirable places and cannot be rendered harmless or moved to a safe place without risk. Naturally, the device according to the present invention may also be employed to protect the surroundings when it becomes necessary to carry out a detonation for other reasons in the immediate vicinity of such matter as could be damaged by the detonation.

In the absence of any previous, generally accepted designation of a product of the type under consideration here, the product will hereinafter be referred to as a "blast canister".

The present invention also encompasses a method of producing the blast canister in question.

The major characterizing feature of the blast canister according to the present invention is that it functions according to the double principle of first deflecting as large a proportion as possible of the detonation force formed on detonation of an explosive charge placed in the canister, as well as any splinters formed thereby, in a direction which is harmless to the immediate surroundings, i.e. in most cases in an upward direction, and then absorbing the remaining detonation force itself. In this instance, the inventive concept further includes the feature that the device is not to be excessively robust, but that, on the contrary, deformation possibilities may be accepted (and even incorporated in its design) which may be utilized to convert the detonating forces into mechanical work. The blast canister according to the present invention is thus as a rule consumed or spent after one detonation, but this drawback is many times cantered by the fact that it is possible to make the device according to the present invention easy to handle and relatively cheap in manufacture. In one particularly advantageous design, the blast canister consists of a plurality of layers of helically wound sheet of a width progressively reducing after the first turn or turns, either being wound inwardly or outwardly. This design only needs to be held together by spot welding so that it keeps together up to the point when it is exposed to an interior detonation. In the rapid cycle which the detonation implies, it will in fact be the friction between the sheet layers which is primarily responsible for cohesion between the sheet layers. By manufacturing the blast canister from helically wound sheet metal, it is possible to make use of the high specific mechanical strength values of the thinner sheet metal material, while achieving a simple production process and by causing the sheet metal to be of progressively smaller width, i.e. departing from a substantially triangular sheet metal configuration after the first turn or turns, there will be obtained a blast canister with increasingly thicker walls in a downward direction. Envisaging that the blast canister is placed about a charge disposed on or in ground level with its thicker wall portion down towards ground level, a blast canister will thus have been realized which possesses maximum strength at that region which will be exposed to the greatest stress.

By commencing the helical winding of the sheet metal either with its narrowest or broadest portion, it is possible to produce blast canisters with either a substantially smooth and whole outer face or a substantially smooth and whole inner face. This makes it possible to produce blast canisters pairwise which fit closely into one another and which may be employed together as soon as the suspicion is raised that a single canister might be a little on the weak side. Correspondingly, several such pairs may be given progressively larger diameters so that they fit into one another in order to make for ease of transport. In the case of blast canisters of equal strength, these may be produced irrespective of their own inside diameter - from helically wound sheet metal pieces of the same length, but if the angle of deflection from the site of detonation (i.e. theoretically the centre of the bottom plane of the blast canister) is to be the same irrespective of the canisters, the different blast canister pairs must be made progressively taller in dependence upon its own inside diameter, i.e. must be manufactured from progressively wider sheet metal even though such sheet metal can be kept of equal length for all pairs. This latter is because the detonation force fades with distance and consequently the blast canisters will fulfil their purpose with progressively smaller wall thickness according as their diameters increase. In its simplest form, the blast canister is an open cylinder whose largest material thickness faces towards ground level. However, for military use there are so called jump mines which are thrown by a small propellant charge a metre or so into the air before bursting. Thus, such a mine would be capable of jumping out of the blast canister if no special measures were adopted. According to a slightly more sophisticated form of the device according to the present invention, the blast canister is therefore provided with a permanently mounted grid top which, if it is upset or clinched along the edges so that it first extends obliquely up from the upper sheet metal edge of the blast canister in order thereafter to form a substantially planar grid top, its obliquely inclined edge portion may of-

fer a useful handle for lifting and short-distance transport. Moreover, the blast canister will, in this manner, prove useful as a seat during work breaks.

The blast canister according to the present invention has been defined in the appended claims and will now be described in greater detail in connection with a number of non-restricted examples.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The nature of the present invention and its aspects will be more readily understood from the following brief description of the accompanying Drawings, and discussion relating thereto.

In the accompanying Drawings:

Fig. 1 is a longitudinal section through a double blast canister according to the present invention;

Fig. 2 shows half of the cross-section of the same blast canister;

Fig. 3 shows, on a smaller scale, a sheet for producing the blast canister according to Figs. 1 and 2; and

Fig. 4 is a longitudinal section through a blast canister set.

DESCRIPTION OF PREFERRED EMBODIMENT

Two different metal sheets 1a and 1b will be obtained from the sheet 1 illustrated in Fig. 3 after the division, marked on the drawing, along the line 2. As will be apparent from the figure, each metal sheet begins with a portion of uniform width 1a' and 1b', of which 1a' is, however, somewhat narrower than 1b' - this in order that the finished blast canister parts be capable of fitting in one another. In addition, the screened angle of each respective canister portion, seen from the centre of its bottom plane, will be substantially equal by such means, since the canister with the larger diameter (in this case manufactured from the sheet 1b) will also be the taller. As intimated in the figure, the central region of the sheet metal has been omitted, since the figure would otherwise be on an unacceptably small scale.

By way of example, it may be mentioned that the metal sheet is 10 metres in length, 500 mm in width and 2 mm in thickness.

The sheet 1a is now helically wound, counting from the tip, in tightly adjacent turns in which the first turn may, for example, have an inside diameter of 430 mm. When the helical winding has been completed, the inner blast canister portion 3 shown in Fig. 1 will have been obtained. The various sheet metal turns are held together by permeating spot welds marked 4 on the figure. The two first turns may possibly also be edge-welded as well. This has been marked by reference No. 5 on the figure.

The metal sheet 1b is now helically wound to a second blast canister portion 6 which, keeping to the previously disclosed dimensional information, may have an inside diameter of 470 mm and, as shown in Figs. 1 and 2, fit over the portion 3. The welding indications are the same on all figures. Uppermost, both of the blast canisters are provided with a grid roof or top 7 and 8, respectively, in the form of a powerful mesh shaped like a lid with a planar top surface 7a and 8a, respectively, covering the major portion of the upper surfaces of the canisters, and obliquely beveled edge portions 7b and 8b, respectively. At the outer edges of the edge portions, the mesh is fixedly welded to the upper edges of each respective blast canister portion.

The blast canister illustrated in Figs. 1 and 2 is now ready for use and is then quite simply placed over the charge which it is desired to screen off from the surroundings for reasons of protection so that the charge is located in the centre of the canister. If it is certain that the charge is small, only one of the canister parts may possibly be used.

As a result of its specific method of manufacture, the canister will have its greatest mechanical strength and the material thickness closest to the charge, i.e. closest to ground level. The employment of rolled sheet metal also makes it possible to utilize to the full the superior specific strength of the sheet metal material, implying that the blast canisters may be made relatively light and at a relatively low cost. Since it is primarily the friction between the different sheet metal turns that must absorb the extremely rapid cycle of the detonation, it is not necessary to place any specific requirements on the spot welding and the edge welding (if any) other than that they must prevent the sheet metal from unwinding prior to use.

In its turn, the grid top or mesh is intended to prevent jump charges from being ejected out of the canister. Otherwise, no major requirements are placed on the grid or mesh. For example, it would be of no consequence if the grid top is torn apart and splintered by the detonation force, as long as it ensures that the detonation proper actually takes place within the blast canister.

Fig. 4 shows four different double blast canisters 9-16 nested in one another and ready for transport. These may be produced from the same sheet metal material and from sheet metal of the same length but of progressively increasing width.

Naturally, several double pairs may be employed nesting outside one another if it is suspected that the charge in question is extra powerful.

The present invention should not be considered as restricted to that described above and shown on the drawing, many modifications being conceivable without departing from the spirit and scope of the appended claims.

Claims

1. A blast and splinter-proof screening device, a so-called blast canister (3, 6) intended to be placed on the ground and there screen off and protect the surroundings from the detonation forces, and possibly splinters from detonating explosive charges primarily of limited force and disposed on, in the immediate vicinity of or in ground level, **characterized in that** it has the form of a cylinder which is substantially open at both ends and whose circumferential surface is of progressively greater wall thickness in a direction towards that end which is intended to be turned to face towards ground level.

2. The blast canister as claimed in Claim 1, **characterized in that** its circumferential surface is produced from a number of turns of helically wound sheet metal (1a, 1b) which, after that extent which corresponds to one or more turns, has been given progressively smaller width from that longitudinal edge which is to form that end which is intended to be turned to face ground level.

3. The blast canister as claimed in Claim 2, **characterized in that** the different sheet metal turns (1a, 1b) of the circumferential surface are fixed in relation to one another by means of permeating spot welding (4), as well as possible edge welding (5) along one or a couple of turns most proximal its outer face and inner face, respectively.

4. The blast canister as claimed in any one of Claims 1-3, **characterized in that** that of its ends which is intended to be turned to face away from ground level is covered by a powerful, permanently welded mesh grid (7, 8) for the purposes of protection against jumping charges.

5. The blast canister as claimed in Claim 4, **characterized in that** the mesh grid (7, 8) is formed as a lid with a first, planar or largely planar main surface (7a, 8a) which covers the greater part of the upper region of the blast canister, and a second edge portion (7b, 8b) in the form of a truncated cone obliquely clinched from this main surface, and along whose outer edge the mesh grid is welded to the upper edge of the circumferential surface.

6. A blast canister set (3, 6) consisting of two canisters loosely nested in one another in accordance with any one of Claims 2-5, the inner (3) thereof being helically wound, with the progressively tapering portion of the sheet metal (1a) facing inwardly, while the outer thereof is helically wound with the tapering portion of the sheet metal (1b) facing outwardly, and the distance between the substantially smooth outer face of the inner blast canister portion and the substantially last inner face of the outer not exceeding the maximum thickness of the canisters.

7. A blast canister delivery comprising a plurality of mutually nested canister sets each consisting of two pairwise mutually adapted canisters (9-16) as claimed in Claim 6, the canisters having progressively greater height from the smallest innermost to the largest outermost canister.

8. The canister delivery as claimed in Claim 7, **characterized in that** all canisters in the set are produced from helically wound metal sheets of equal length.

9. A method of producing blast canisters as claimed in any one or more of Claims 1-8, **characterized in that** they are produced from a metal sheet (1) helically wound in tight turns to a cylinder open at both ends, in which the turns are interconnected by means of spot welding (5).

10. The method as claimed in Claim 9, **characterized in that** the metal sheet (1) is, prior to the helical winding after a distance corresponding to one or more complete turns, obliquely cut to a progressively smaller width along its one edge.

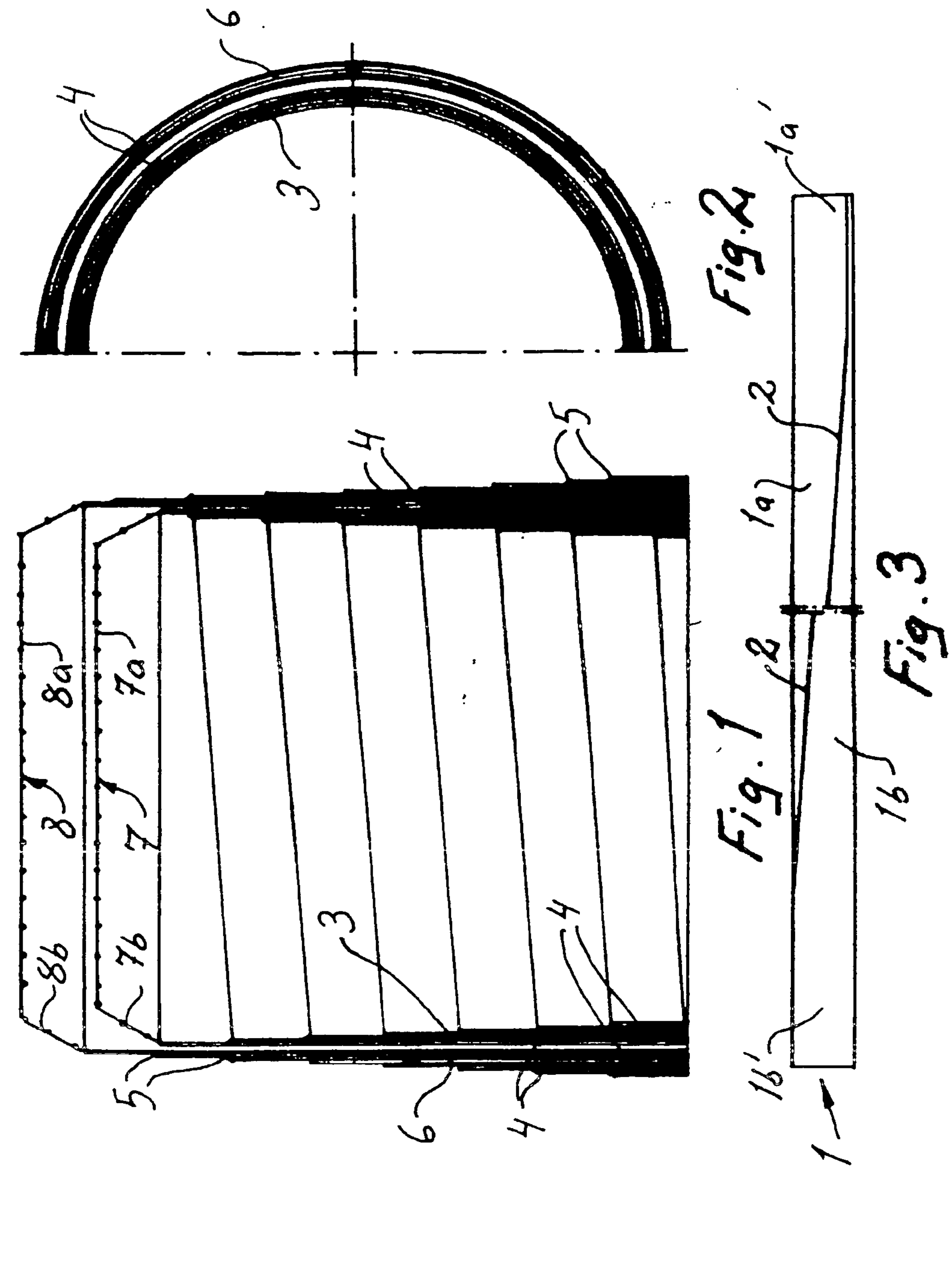
Fig. 1
Fig. 2
Fig. 3
1
1a
1a'
1b
1b'
2
3
4
5
6
7
7a
7b
8
8a
8b

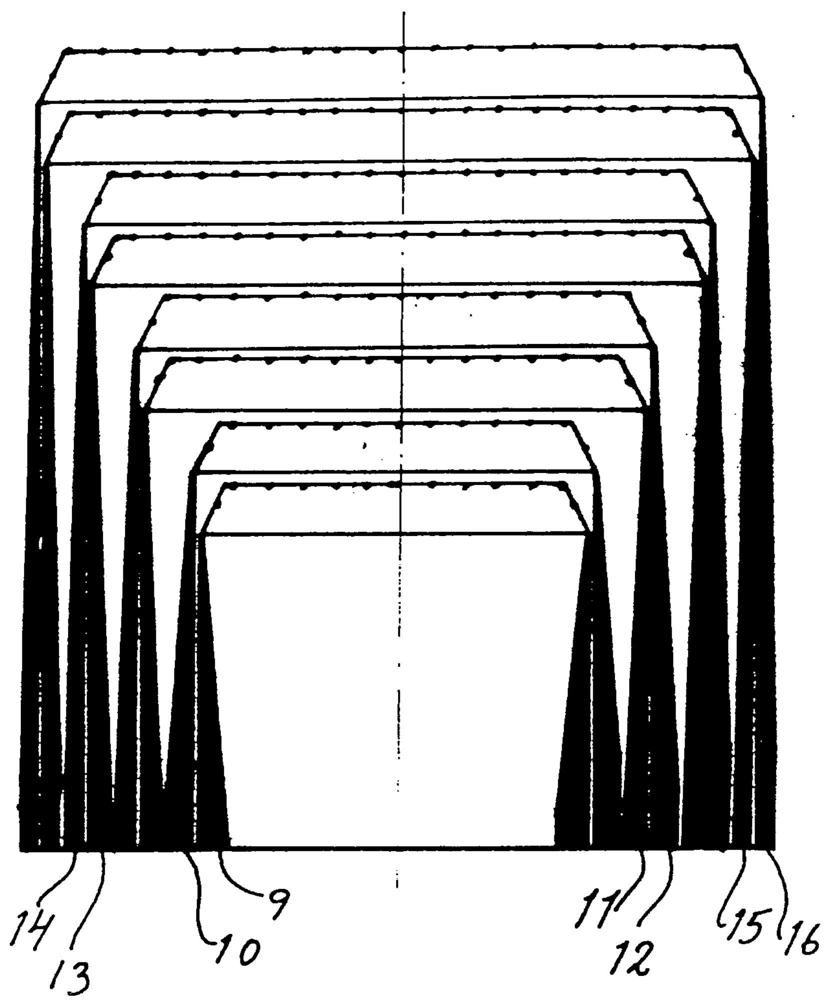

Fig. 4